Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Wireless Telecommunications	)	WT Docket 14-180
Bureau Reminds Paging and	)	
Radiotelephone Service	)	
Licensees of Certain Technical	)	
Rules and Seeks Comment on	)	
the need for Technical	)	
Flexibility	)	

COMMENTS BY JAMES MEDLOCK ON
THE NEED FOR FLEXIBILITY IN THE PART 22 RULES.

By:
James A. Medlock
139 Dunbar Street
Manchester, NH 03103

On October 17th, 2014, the Federal Communications Commission ("FCC") issued a Notice reminding licensees of certain rules that must be complied with for Part 22 Paging and Radiotelephone Service. The FCC solicited comments on whether it would appropriate to update these rules in order to allow some flexibility such that other technologies could be used in these channels resulting in more intensive use of them and thereby a national benefit for users.

The James Medlock welcomes the opportunity to comment on this idea and believes that there is a demand from users for improved and enhanced digital modulation radio systems in Part 22 channels and that the small changes that would need to be made to the Rules would not only maintain adequate interference protection for existing users on the channels but permit increased protection from interference while improving services and increased spectrum efficiency.

Comments on :

DA 14-1508 October 17, 2014

WIRELESS TELECOMMUNICATIONS BUREAU REMINDS PAGING AND RADIOTELEPHONE SERVICE LICENSEES OF CERTAIN TECHNICAL RULES AND SEEKS COMMENT ON THE NEED FOR TECHNICAL FLEXIBILITY
WT Docket 14-180

Comments Due: December 17, 2014

These referenced blocks of spectrum "Part 22 Upper & Lower Paging" began their existence by serving the public with mobile telephone service, provided by wireline carriers and radio common carriers. This type of service was then migrated to the present cellular, PCS, GSM, etc mobile services, leaving this referenced spectrum "Part 22", after having gone through several

additional re-allocations (such as Mobile Telephone, BETRS, Rural Telephone, paging, etc.) this spectrum became mostly fallow and open to auction. This spectrum exists in the VHF-Lo bands (35 & 43 MHz), the VHF-Hi band (152 & 157-158 MHz), UHF band (454 & 459 MHz) and now include the 900 paging band (931 & 929 MHz).

These frequencies were organized into paired channels for duplex operation having a proper separation between the transmit and receive, a trait highly suitable and most appropriate for wide area multicast radio systems. This one characteristic makes this spectrum appropriate for significant spectrum efficiency, significant amount of services and capabilities deliverable to the end-user of the communications systems.

Need for Technical Flexibility:

Technical flexibility will promote the efficient use of the spectrum, the adoption of advanced technologies, providing services and capabilities now prevented by the narrow channel bandwidth of 20 KHz and others (narrowbanding to 12.5 & 6.25 KHz), and adoption of improved services and value of the radio systems to the end users, as well as the resultant increased value of the spectrum. This value will be a summation of the increased services, increased spectrum efficiency, increased propensity for the development and application of new and/or improved modulation and radio technologies, and increased protection from the generation of interference.

“Channel Bandwidth”
Presently these channels have various bandwidths (channel spacing) however the FCC has blanket applied 20 KHz as the authorized bandwidth. This must be altered to match the actual channel spacing / bandwidth of each section of this spectrum so that the full capability of the channel may be utilized by the modulation technique. Additionally these channels must be permitted to be aggregated together (adjacent channels) to increase the available bandwidth for advanced radio services. These channels could be permitted, on as needed or adaptive basis, to be joined together for a resultant “wider band” channel, providing the bandwidth for increased services and digital throughput link speed.

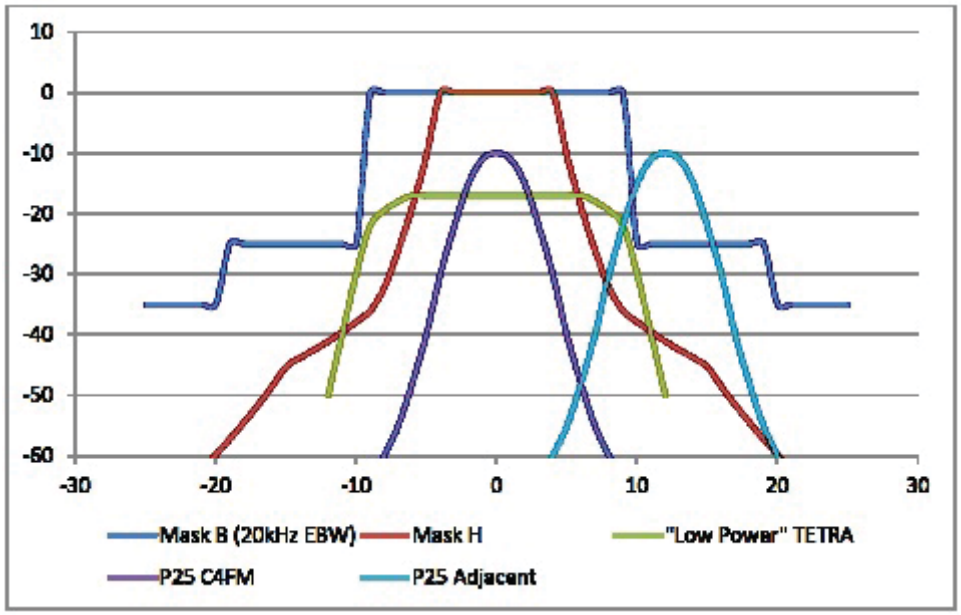
The VHF-Lo band channels are actually 20 KHz channels. The VHF-Hi channels are actually 30 KHz (except for two) and full use of the 30 KHz should be afforded. The UHF 450 MHz channels are 25 KHz, and the full bandwidth of 25 KHz must be permitted. Because of these characteristics, these channels should be relegated only to full bandwidth (for most spectrum efficiency) enhanced digital land mobile radio use for single site to multi site multicast systems. The full bandwidth of the channels must be encouraged for use, and even some level of adjacent channel power limits increased in order to facilitate higher speed digital modulation schemes. This is not an issue as many make it to be as these channels are essentially ‘exclusive use’ and are usually contained within the same system. Should adjacent systems exist (adjacent channels use) then the system designs must be relied upon to mitigate interference and not the sacrifice of bandwidth and digital rate by the imposition of an arbitrary emission limit.

Additionally, the radio service use of these channels must be freely open to both commercial and private radio systems. The consideration for paging operation can now be discharged as cellular, wireless, WiFi, other paging bands and the enhanced radio protocols include those capabilities, as well as the very large decline in paging services and customers. Finally, when these channels are under a waiver of Pt 22 to Pt 90, the technical requirements established for these channels must remain enforced and not degraded to those of Pt 90. However, it should remain that existing Pt 90 authorized radio equipment can be used on this particular spectrum without modification or re-certification for a period of time determined by the FCC’s increase in

Pt 90 requirements to match those of Pt 22. Doing so will stimulate the development of advanced technologies, such as cognizant radio, SDR, and advanced modulation protocols, as well as provide enhanced communications capabilities to end users (such as medium speed data, 19.2 to 750 kbps). Further, in support of regulatory flexibility for this spectrum, the function of frequency coordination must never be used nor implemented as these are essentially “exclusive use” and any interaction will be handled by proper engineering design of the systems.

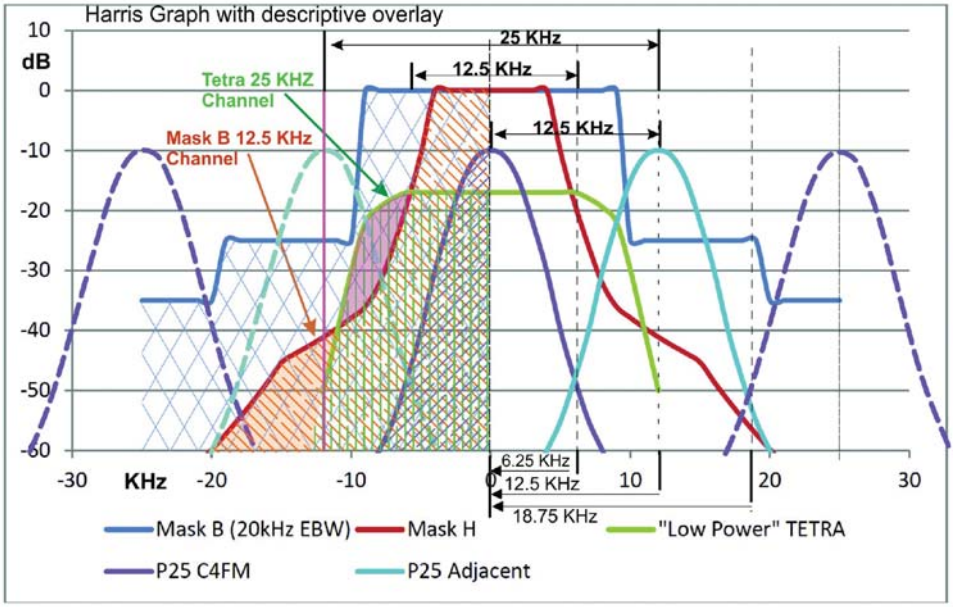
“Emission Limitations”
There presently is an argument on two sides concerning the emission mask characteristics and the allowance of an advanced, enhanced digital modulation protocol on the USA Spectrum. This argument against the emission is highly unfounded, has not been proven in any empirical experiments published in white papers, and has the appearance of being completely moot due to the lack of FCC specifications for receivers used in any of the FCC radio services. This argument against the digital modulation is again negated due to the number of different emission masks promoted by the FCC R&R, each being based on a particular type of modulation and source of modulation signal. As well, the complaint aganist advanced digital modulation and adjacent channel interference by a particular modulation protocol is further contradicted by the details of the submision itself. This is contained in a submission by the Harris Corp to the FCC as a Ex Parte Notice WT Docket 11-69, ET Docket 09-234 as submitted on April 2, 2011 (attached).

Harris Generated graph of emissions & masks:



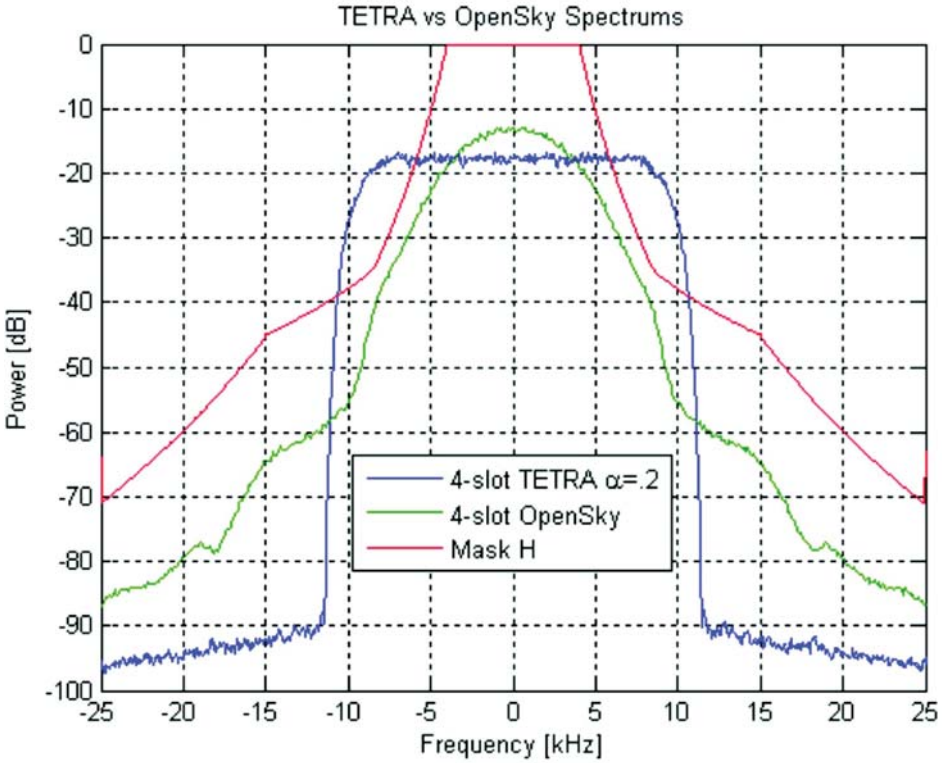
Harris April 2, 2011 Ex Parte Notice WT Docket 11-69, ET Docket 09-234

The nabove graph demonstrates that the Harris argument against 25 KHz emissions is faulted in that they compare that to two 12.5 KHz unspecified envelopes which claim to be representative of P-25 ph 1 (and not the P-25 ph 2 TDMA version), both of which are clearly co-channel to the 25 KHz emission and not adjacent channel as is claimed. Additionally the Part 22 spectrum does not and should not have any provisions for 12.5 KHz channels. This would intolerable restrict the development of new radio services and technology as well as severely constrain the capabilities and features of any radio service so restricted to a 12.5 KHz channel emission. Likewise the demonstrated Tetra envelope is far superior in interference suppression as compared to the FCC B & H masks.

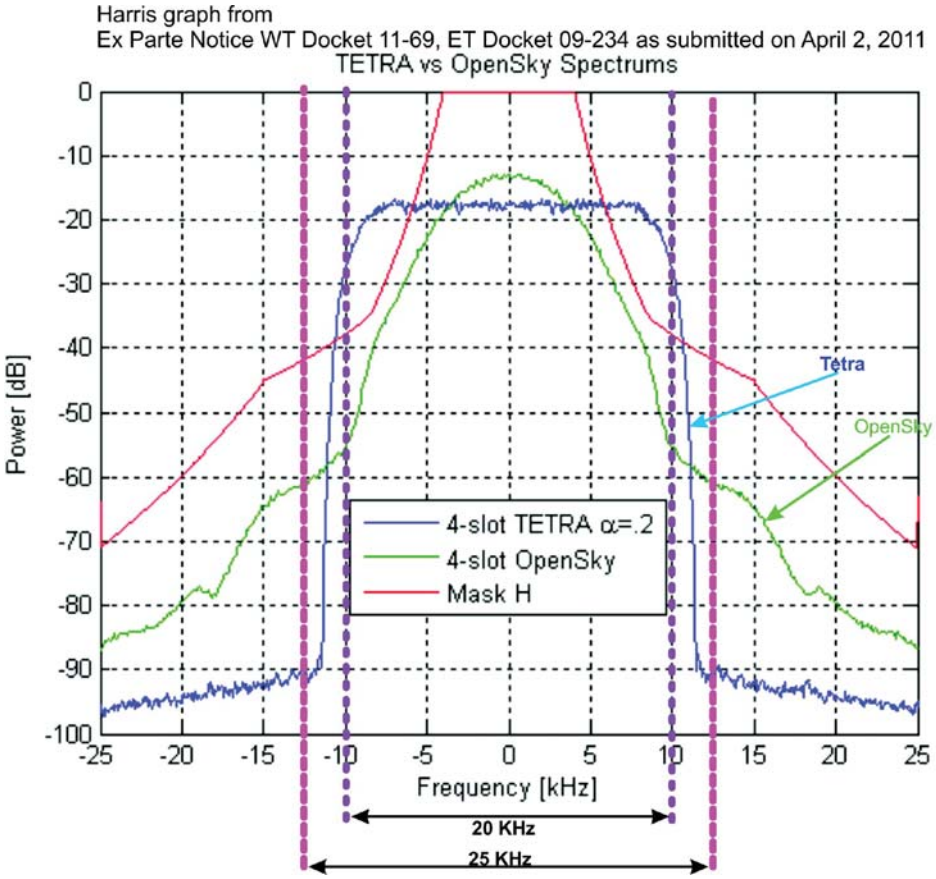


The above graph is marked up to show the interference of the three envelopes under dispute: Tetra, Mask B, and Mask H. It is cearly evident that the Tetra envelope has far superior slope than that of the others, transiting far less KHz into the adjacent channel than the other masks. Perhaps this exemplifies why Tetra envelope should be chosen as the only emission mask permissible in this spectrum as it is far “cleaner” and far less energy is located in the adjacent 25 KHz channel boundary. Again, this also supports the need for the FCC to specify a companion receiver “reception mask” for all “Safety of Life” radio communications equipment and systems. A poor receiver “reception mask” would actually promote interference to the received signal by having a too wide of a receive bandwidth which could pick up emissions from within the channel boundaries of the adjacent channel.

Harris “Tetra vs OpenSky Spectrums” graph



Harris April 2, 2011 Ex Parte Notice WT Docket 11-69, ET Docket 09-234



Annotated Graph

Summary of above graphs: The argument of interference to adjacent channel is moot. Based upon: A) the "adjacent channel" being in reality a co-channel element of the 25 KHz carrier, B) the fact that the part 22 spectrum is predominantly 25 KHz or wider channels (Note: 806-824 MHz channels are 25 KHz channels), and C) the Tetra emission envelope is clearly much less interference, having much sharper and deep "skirts" than the other emission types. This makes Tetra clearly the leader in clean signals and the least interference to other communications channels.

With the advent of Digital Modulation, it seems and can be demonstrated that only one emission mask is necessary, and that it must be based upon the RF Carrier channel spacing or bandwidth and the characteristics of the receiver used. Hence, a 25 KHz channel should have only one emission mask which will facilitate maximum spectrum efficiency, best possible radio services & features to the end user, and therefore maximum value. Again, this is contingent upon the receivers having specific characteristics "Reception Mask" and hence must meet requirements specified by FCC R&R. These Reception Mask requirements are used in conjunction with the Emission Mask and the radio system design to ensure the greatest avoidance of interference. A rather more complete assurance of minimum interference as opposed to only a transmitter mask.

All three factors, Emission Mask, Reception Mask, and system design are closely related and interact to form the least interference and best possible services to the users. This permits the proper fixed design of radio systems and facilitates development of new technologies and radio system improvements without restrictions. Simply, it limits the amount of adjacent channel power, at a fixed level regardless of source of information for the modulation, which can exist in an adjacent channel service area.

“Effective Radiated Power Limits”

47 CFR 22.535 specifies the power output and the effective radiated power of transmitters used in this spectrum. It should be noted that the addition of range limits in the VHF-Hi section of this spectrum by Part 22.535 (c) is considered to be contra-productive to the establishment of viable service oriented radio systems. The VHF Hi spectrum is uniquely suited for rural and rough terrain areas and should not be so restricted in its range and therefore service capabilities. This is also pertinent in that this spectrum is not of a “‘shared radio’ type, but rather much more an ‘exclusive use’ type of radio services. Therefore the ultimate range of the signal must be permitted based upon the system design necessary to provide the proper signal levels within the described or prescribed service area. Many trunking systems have range capabilities far higher that those presently permitted. These presently prescribed short ranges severely complicate the system design, increase the cost of infrastructure by the need for more sites, and severely compromise the establishment of radio services in forests, mountainous, rural and open areas of the USA.

“Permissible Operations”
This spectrum should be opened to all type of radio communications provided it serves the interest and necessity fo the public at large. One way paging is far too restrictive of a limitation, others should be included such as voice & data two way communications, medium bandwidth two way data communications, cooperative multi user Trunking radio systems, single site rural two way radio systems, muti-site two-way radio communications systems, and the authorization for mobile to mobile communications such as found in ‘talk around’ or DMO capabilities.

“Permissible communications paths”
This should be expanded to include direct mobile to mobile communications as found in ‘talk around’ or DMO features of present radio communications capabilities. Also communications with aviation platforms must be included in order to fully support all potential and actual users of the spectrum.

“Equipment authorization”
Presently only Part 22 authorizations for equipments emissions is permitted. However it is pertinent to include any equipment which has obtained Part 90 emission authorizations provided the proper emission envelope is demonstrated (such as previously mentioned about Tetra emission) and the proper receiver “reception envelope” is employed and certified.

Conclusion:
Should the FCC institute regulatory flexibility in the Part 22 spectrum? A whole-hearted Yes is applicable for this question. Doing so will permit additional uses and additional services to be implemented along with advances in technology to be nurtured.

//signed’‘
Jim Medlock

Attachment A

FCC Public Notice DA 14-1508

PUBLIC NOTICE

Federal Communications Commission
445 12th St., S.W.
Washington, D.C. 20554

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DA 14-1508
October 17, 2014

WIRELESS TELECOMMUNICATIONS BUREAU REMINDS PAGING AND RADIOTELEPHONE SERVICE LICENSEES OF CERTAIN TECHNICAL RULES AND SEEKS COMMENT ON THE NEED FOR TECHNICAL FLEXIBILITY

WT Docket 14-180

Comments Due: December 17, 2014

Reply Comments Due: January 19, 2015

Licensees authorized in the Paging and Radiotelephone Service generally have the authority to operate various voice and data services, and they must comply with all applicable Part 20 and 22 rules. Through this Public Notice, we highlight several rules with which Part 22 Paging and Radiotelephone Service licensees must comply, and seek comment on any technical or operational flexibility that the Commission may provide that might result in more intensive use of the band.

Part 22 Rules

- Channel bandwidth. Unless otherwise indicated, all channels have a bandwidth of 20 kHz and are designated by their center frequencies in megahertz.[1] The paging channel spacing may be more than 20 kHz, but the authorized channel bandwidth as specified by the rules is 20 kHz (10 kHz to each side of the center frequency).
- Emission limitations. Under Part 22, the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power by at least 43 + 10 log (P) dB.[2] Alternative out of band emission limits may be established at specified frequencies (band edges) in specified geographical areas pursuant to a private contractual arrangement among all affected licensees and applicants, and must be disclosed to the FCC, upon request.[3]
- Effective radiated power limits. The effective radiated power (ERP) of transmitters operating on paging channels must not exceed the limits in section 22.535.[4]

[1] *See* 47 C.F.R. §§ 22.531, 22.561.

[2] *See* 47 C.F.R. §22.359(a). Section 22.359 does not apply to the Air-Ground Radiotelephone Service or the Cellular Radiotelephone Service. The applicable emission limits for the Air-Ground Radiotelephone Service and the Cellular Radiotelephone Service are specified in sections 22.861 and 22.917, respectively. *See* 47 C.F.R. §§ 22.861, 22.917.

[3] *See* 47 C.F.R. §22.359(c).

[4] *See* 47 C.F.R. § 22.535.

- Permissible operations. The channel assignments listed in section 22.531 are allocated for one-way paging operations. Assignments listed in section 22.561 are for one-way or two-way mobile operations.[5]
- Permissible communications paths. Mobile stations may communicate only with and through base stations. Base stations may communicate only with mobile stations and receivers on land or surface vessels.[6]
- Equipment authorization. The Commission authorizes equipment under rule parts where the applicable technical standards for that equipment are established. Therefore, all the equipment operated in Part 22 paging must have been certified by the Commission under applicable Part 22 paging rules.
- Protection of existing service. Pursuant to section 22.537 or section 22.567, all facilities authorized to operate pursuant to a paging geographic area authorization must provide co-channel interference protection to all authorized site-based co-channel facilities of exclusive licensees within the paging geographic area.[7]
- Licensees planning to operate transmitters north of Line A are first required to obtain Canadian clearance by filing a modification of their license(s), including the technical parameters of the planned site, in order for the Bureau to coordinate planned operations with Industry Canada.[8]

Future Flexibility

The Bureau reminds licensees that they must comply with these and all other applicable Commission rules unless the licensee obtains a waiver pursuant to section 1.925 of the Commission's Rules.

The Bureau, however, recognizes that additional technical and operational flexibility may promote more intensive use of the licenses and thereby benefit users nationwide. In this light, we seek comment on whether it is appropriate to consider updating the Part 22, Subpart E, Paging and Radiotelephone Service rules to provide flexibility in the types of uses and technologies that can operate on these channels. Such an update could result in licensees deploying innovative technologies, deploying narrowband equipment, or using offset frequencies if they hold adjacent channel blocks.

For example, the Commission released a Report and Order on September 21, 2012, in which it modified Part 90 rules to permit the certification and use of TETRA equipment in two bands – the 450-470 MHz portion of the UHF band (421-512 MHz), and Business/Industrial Land Transportation 800 MHz band channels (809-824/854-869 MHz) that are not in the National Public Safety Planning Advisory Committee (NPSPAC) portion of the band.[9] However, use of TETRA equipment on Part 22 frequencies may violate channel bandwidth and emission limitations rules. Should the Part 22 rules be updated to permit technologies like TETRA?

As a further example, licensees planning to deploy transmitters north of Line A are required to first obtain Canadian clearance. Some licensees, who are unable to get Canadian clearance on the center frequency, may wish to use offset frequencies in order to get Canadian approval. Use of frequency offsets may violate channel bandwidth and emission limitation rules. We seek comment whether flexibility in channel bandwidths would be useful in these instances and under what conditions.

We also seek comment generally on updating and streamlining our Part 22 Paging and Radiotelephone rules. Commenters should provide support for their positions including technical analysis if necessary to demonstrate that technical rule changes would not result in increased interference in the band.

Procedural Matters

[5] *See* 47 C.F.R. §§ 22.531, 22.561, 20.9(a)(6).

[6] *See* 47 C.F.R. § 22.515.

[7] *See* 47 C.F.R. § 22.503(i).

[8] *See* 47 C.F.R. § 22.169.

9 *See* Amendment of Part 90 of the Commission's Rules to Permit Terrestrial Trunked Radio (TETRA) Technology, *Report and Order*, 27 FCC Rcd 11569 (WTB 2012).

Comments on the request are due **December 17, 2014**. Reply comments are due **no later than January 19, 2015**. All filings should reference the docket number of this proceeding, **WT 14-180.**

This proceeding has been designated as a "permit-but-disclose" proceeding in accordance with the Commission's *ex parte* rules.[10] Persons making *ex parte* presentations must file a copy of any written presentation or a memorandum summarizing any oral presentation within two business days after the presentation (unless a different deadline applicable to the Sunshine period applies). Persons making oral *ex parte* presentations are reminded that memoranda summarizing the presentation must (1) list all persons attending or otherwise participating in the meeting at which the *ex parte* presentation was made, and (2) summarize all data presented and arguments made during the presentation. If the presentation consisted in whole or in part of the presentation of data or arguments already reflected in the presenter's written comments, memoranda or other filings in the proceeding, the presenter may provide citations to such data or arguments in his or her prior comments, memoranda, or other filings (specifying the relevant page and/or paragraph numbers where such data or arguments can be found) in lieu of summarizing them in the memorandum. Documents shown or given to Commission staff during *ex parte* meetings are deemed to be written *ex parte* presentations and must be filed consistent with rule 1.1206(b). In proceedings governed by rule 1.49(f) or for which the Commission has made available a method of electronic filing, written *ex parte* presentations and memoranda summarizing oral *ex parte* presentations, and all attachments thereto, must be filed through the electronic comment filing system available for that proceeding, and must be filed in their native format (*e.g.*, .doc, .xml, .ppt, searchable .pdf). Participants in this proceeding should familiarize themselves with the Commission's *ex parte* rules.

Comments may be filed using the Commission's Electronic Comment Filing System (ECFS) or by filing paper copies. *See* Electronic Filing of Documents in Rulemaking Proceedings, 63 Fed. Reg. 24121 (1998). Comments filed through the ECFS can be sent as an electronic file via the Internet to http://www.fcc.gov/cgb/ecfs/. Generally, only one copy of an electronic submission must be filed. If multiple docket or rulemaking numbers appear in the caption of this proceeding, however, commenters must transmit one electronic copy of the comments to each docket or rulemaking number referenced in the caption. In completing the transmittal screen, commenters should include their full name, U.S. Postal Service mailing address, and the applicable docket or rulemaking number. Parties may also submit an electronic comment by Internet e-mail. To get filing instructions for e-mail comments, commenters should send an e-mail to ecfs@fcc.gov, and should include the following words in the body of the message, "get form." A sample form and directions will be sent in reply.

Parties who choose to file by paper must file an original and one copy of each filing. If more than one docket or rulemaking number appears in the caption of this proceeding, commenters must submit two additional copies for each additional docket or rulemaking number.

Filings can be sent by hand or messenger delivery, by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail (although we continue to experience delays in receiving U.S. Postal Service mail). All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission.

-Effective December 28, 2009, all hand-delivered paper filings for the Commission's Secretary must be delivered to FCC Headquarters at 445 12th St., S.W., Room TW-A325, Washington, DC 20554. All hand deliveries must be held together with rubber bands or fasteners. Envelopes must be disposed of before entering the building. The filing hours at this location are 8:00 a.m. to 7:00 p.m. **PLEASE NOTE:** The Commission's former filing location at 236 Massachusetts Ave., N.E. is permanently closed.

-Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9300 East Hampton Drive, Capitol Heights, MD 20743.

-U.S. Postal Service first-class mail, Express Mail, and Priority Mail should be addressed to 445 12th Street, S.W., Washington, DC 20554.

[10] *See* 47 C.F.R. §§ 1.1200(a), 1.1206.

Parties are requested to send one copy of their comments and reply comments to Best Copy and Printing, Inc., Portals II, 445 12th Street, S.W., Room CY-B402, Washington, DC 20554, (800) 378-3160, e-mail FCC@BCPIWEB.com.

The request, and comments and reply comments filed in response to this *Public Notice* are available for viewing via the Commission's Electronic Comment Filing System (ECFS) by entering the docket number, **WT 14-180**. The documents also will be available for public inspection and copying during business hours in the FCC Reference Information Center, Portals II, 445 12th Street S.W., Room CY-A257, Washington, DC 20554. They may also be purchased from Best Copy and Printing, Inc., telephone (800) 378-3160, facsimile (202) 488-5563, TTY (202) 488-5562, e-mail FCC@BCPIWEB.com.

Alternate formats of this *Public Notice* (computer diskette, large print, audio recording, and Braille) are available to persons with disabilities by contacting the Consumer & Governmental Affairs Bureau at (202) 418-0530 (voice), (202) 418-0432 (TTY), or send an e-mail to fcc504@fcc.gov.

For further information, contact Moslem Sawez of the Mobility Division, Wireless Telecommunications Bureau at (202) 418-8211, or via e-mail at moslem.sawez@fcc.gov.

Action by the Chief, Mobility Division, Wireless Telecommunications Bureau.

- FCC -

Attachment B

Harris Ex Parte Notice, WT Docket No. 11-69, ET Docket No. 09-234 via electronic filing to FCC Secretary on April 1, 2011

HARRIS CORPORATION

Government Relations
600 Maryland Avenue, S.W.
Suite 850E
Washington, D.C. 20024
phone 1-202-729-3700
fax 1-202-729- 3735

www.harris.com

April 2, 2011

Via Electronic Filing

Ms. Marlene H. Dortch, Secretary
Federal Communications Commission
Office of the Secretary
445 12th Street, SW
Washington, D.C. 20554

Re: Ex Parte Notice, WT Docket No. 11-69, ET Docket No. 09-234

Dear Ms. Dortch:

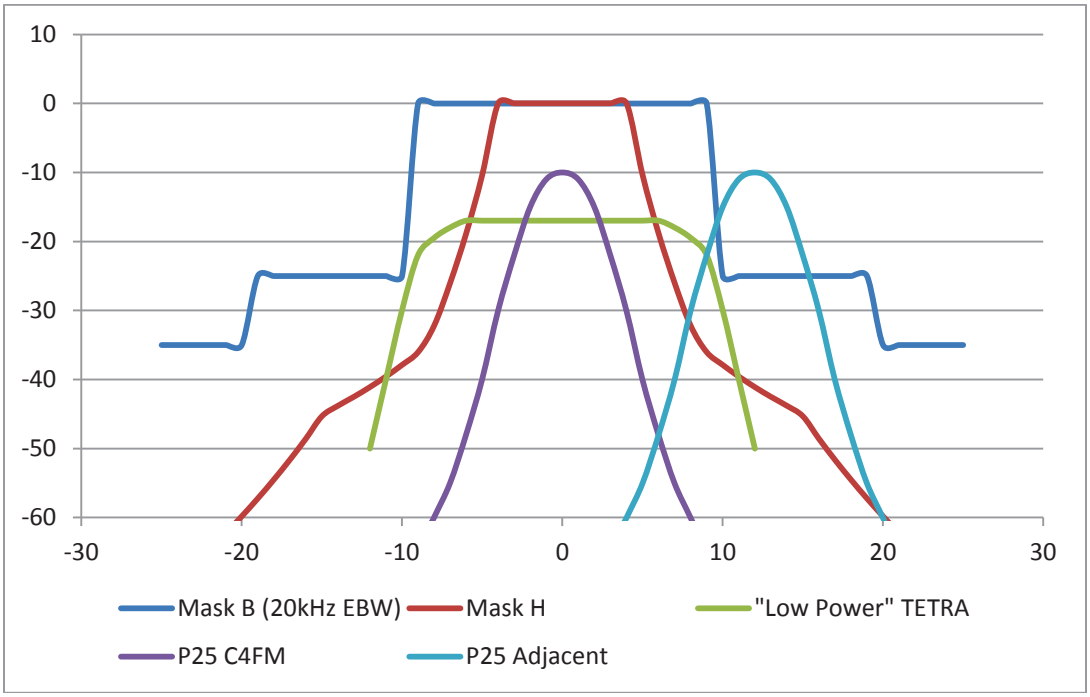
Harris Corporation (Harris) submits further information with regard to use of TETRA and derivative technology in public safety spectrum, and addresses the recent comments of parties that merit response.[1] While Harris intends on submitting more comprehensive proposals in the very near future, Harris feels compelled to respond to assertions in the record that are technically inaccurate.

I. Correcting Inaccurate Statements Attempting to Minimize Interference Resulting From "Low-Power" TETRA Operations in NPSPAC Channels.

PowerTrunk indicates that the modest changes of the TETRA standard it implemented to create its proprietary "low-power" TETRA product makes it safe for operation on public safety frequencies.[2] However, the claim that its α=0.2 filter is an audio filter allowing the use of the MASK-B is inaccurate. This filter operates on the IQ data coming from the pi/4-DQPSK modulation on the dibit symbols coming from the vocoder, specifically to limit the 99% BW to 20 kHz. The spectrum of the generated signal is dependent only on this α=0.2 IQ filter and is independent to any audio filtering that is done on the actual analog signal coming from the microphone and finally into the vocoder. This is in sharp contrast to analog FM modulation where the audio filtering on the voice signal does limit the BW for the transmitted spectrum and to which the Mask-B is appropriate. Therefore, the claim, "…the fact that Mask H was more stringent does not provide any additional benefit in comparison with Mask B…"[3] is false.

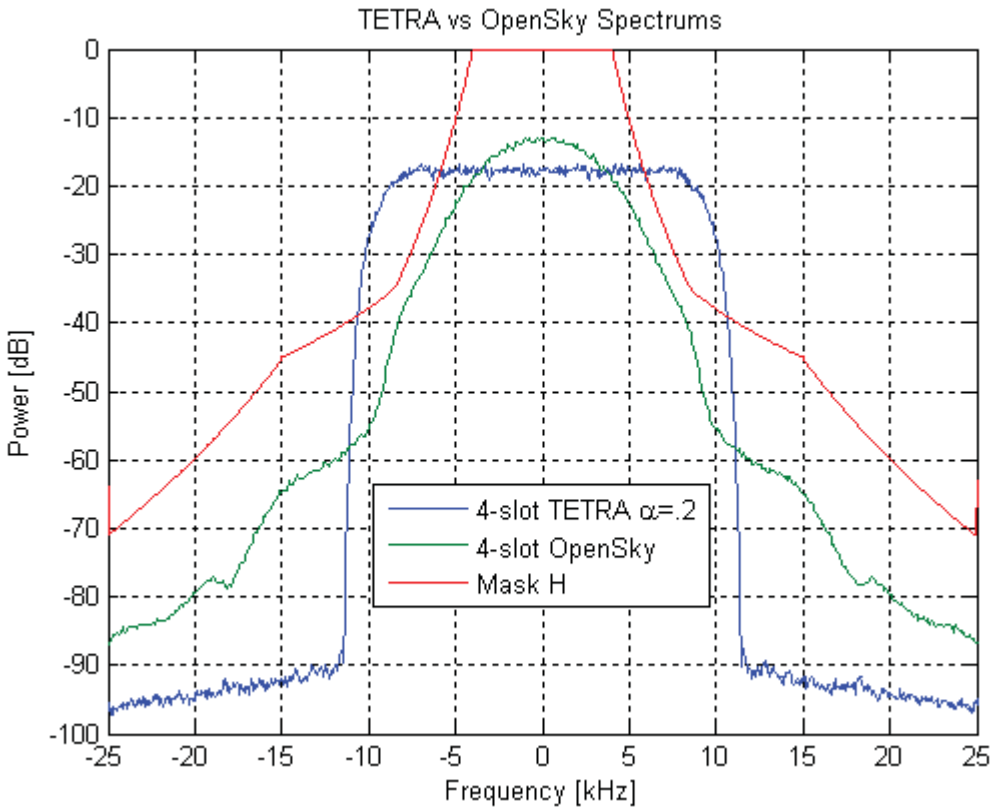
As can be seen from the plots of the emission masks below, Mask-H requires approximately 35 dB more attenuation of the spectrum at certain frequencies than Mask-B. Further, this graphic shows the clear interference to adjacent P-25 systems by "low-power" TETRA, TETRA derivative technology, and all other Mask-B-only technologies.

[1] *See* Ex Parte Notice, PowerTrunk, WT Docket No. 11-69, ET Docket No. 09-234 (Mar. 23, 2012) (PowerTrunk Ex Parte). *See also* Ex Parte Notice, APCO, WT Docket No. 11-69, ET Docket No. 09-234 (Mar. 23, 2012) (APCO Ex Parte).
[2] *See* PowerTrunk Ex Parte at 4.
[3] *Id*.



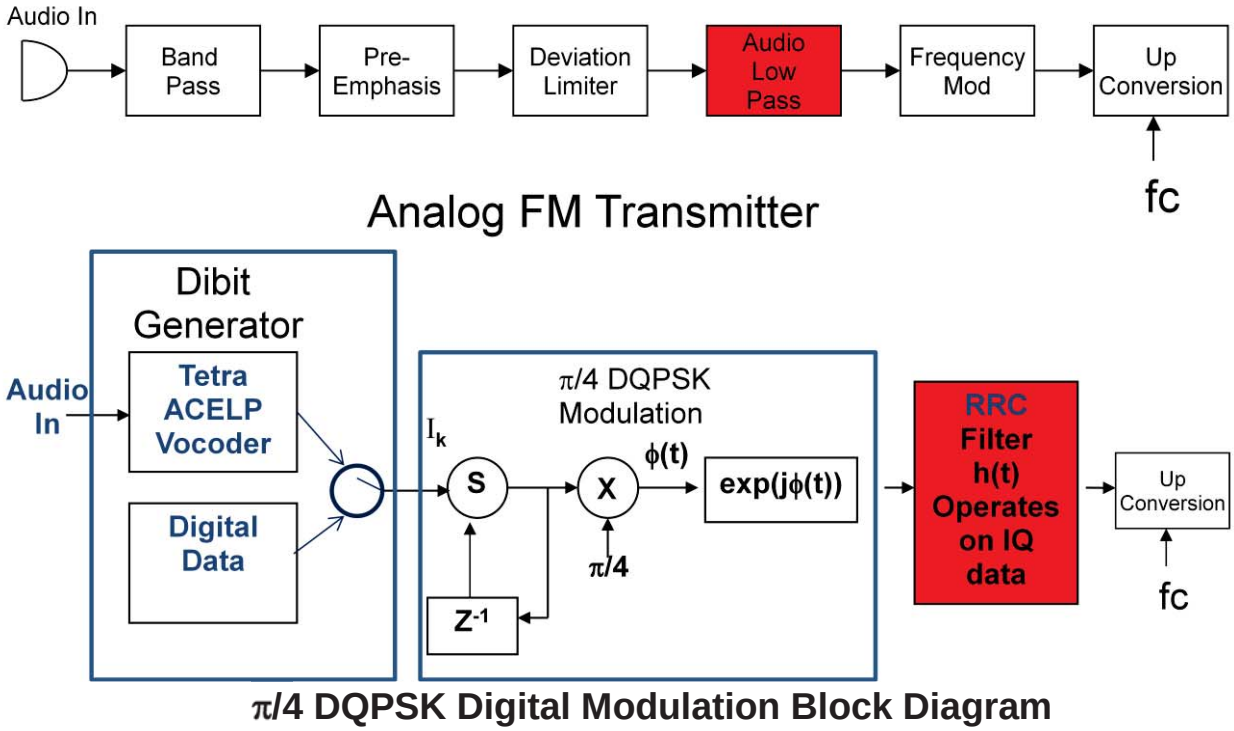
Equally inaccurate is PowerTrunk's statement, "Although it is not entirely clear, if Harris is advocating that NPSPAC frequencies should be restricted to a bandwidth of 12.5 KHz, the result would be that all high-capacity 4-slot TDMA technologies would be banned and thus only low-capacity TDMA technologies would be allowed."[4] High-capacity 4-slot TDMA technologies are safely in operation pursuant to Commission rules today. For example, Harris' OpenSky® LMR product operates using 4-slot TDMA technology with exactly the same voice capacity as TETRA and meets all the spectrum requirements of the NPSPAC H-Mask. In fact, it has greater capacity than TETRA, since a single OpenSky® channel has both control channel and 4-slots of voice in sharp contrast to TETRA which requires a dedicated control slot. A comparison of the TETRA α=.2 spectrum versus the OpenSky® NPSPAC spectrum relative to the H-Mask is shown below.

[4] *Id. at 7.*



Lastly, PowerTrunk claims that "a digital transmitter equipped with an audio low pass filter implemented in the digital domain qualifies for being certificated under Mask B for NPSPAC, and cites a removal of Rule 90.211 in 1999 as some form of justification. Section 90.211 was formerly known as §88.417 (which was deleted from the Commission's Rules in 1999). The language used in Commission documents as §88.417 was modified throughout the years up to and including the eventual deletion of §90.211 supports the assertion the "audio low-pass filter" proviso in §90.210 regarding mask applicability does not apply, or is not available when equipment employs digital modulation. In other words, the "audio low-pass filter" proviso is only available to equipment modes utilizing analog FM modulation. This interpretation is further supported by the fact there is absolutely no difference in the spectrum profile of voice transmissions and data transmissions when digital modulation is concerned. However, the same is not true for equipment employing analog FM modulation.

Below are some simplified block diagrams depicting the differences between analog and digital voice processing. These diagrams clearly show in cases of analog FM modulation the audio low-pass filter referenced in §90.210 regarding mask applicability is applied to the un-modulated audio signal, yet in the case of digital modulation the RRC filter, which is claimed by PowerTrunk to be the equivalent of the audio low pass filter for purposes of mask applicability, is applied to the already modulated signal.



π/4 DQPSK Digital Modulation Block Diagram

It should be noted that, because of a general belief by qualified engineers that the use of the "audio low-pass filter" proviso when selecting applicable masks for equipment employing digital modulation would result in unacceptable levels of interference, public safety equipment manufacturers have not utilized the "audio low-pass filter" proviso in the case of digitally modulated equipment. The fear is that use of the "audio low-pass filter" proviso would lead to the creation of interference in most if not all LMR frequency bands similar to the situation created in the 800 MHz spectrum, which resulted in 800 MHz "Reconfiguration."[5]

II. Recent Activities Compel Harris Input and Commission Action.

Much has been made about the timing of Harris' submissions to the Commission on this matter.[6] Harris has long expressed technical concerns about inevitable interference resulting from TETRA operations in public safety frequencies.[7] Moreover, Harris earnestly believed that the Clarification Order resolved this matter and precluded "low-power" TETRA operation in public safety frequencies.[8] Harris also believed that the obvious, recorded interference concerns and the FCC's input on this matter would preclude any jurisdiction from being able to justify using TETRA and derivative technology in NPSPAC spectrum. However, due to the fact that these concerns were not heeded in the

[5] It is vital to note that the discussion above applies to radio devices, and that base stations bring with them additional concerns. In the case of a TETRA, TETRA derivative, or other digital base station technologies, there is no audio path in which to even apply an audio filter. Meanwhile, analog repeaters do demodulate and re-modulate, and hence audio filtering can be incorporated into an analog repeater.`

[6] *See, generally, id.*

[7] *See, e.g.*, Comments of Harris Corporation, WT Docket No. 11-69 and ET Docket No. 09-234, 5-8 (filed Jun. 27, 2011).

[8] *See Order on Clarification*, WT Docket No. 11-69 and ET Docket No. 09-234, 26 FCC Rcd 13360 (rel. Sept. 28, 2011) ("Clarification Order") (stating the Commission's intent to "ensure that TETRA equipment would not be operated in the vicinity of public safety systems.").

case of New Jersey Transit (NJT), and as applications for Commission authorization to use "low-power" TETRA by NJT in public safety frequencies are imminent, Harris believes that additional, immediate action from the Commission is necessary. Further, this issue now expands beyond the decision of one jurisdiction: If NJT is allowed to use "low-power" TETRA in NPSPAC channels, other jurisdictions may follow suit, leading to widespread interference among first responders on a nationwide basis.

Ultimately, complaints about the timing of Harris' assertions cannot mitigate the interference that both TETRA and "low-power" TETRA will cause to first responders in the field. These concerns have been well affirmed by APCO in its recent filing:

> …a vendor is currently seeking to deploy TETRA equipment on public safety spectrum, claiming that it will operate at "low power" and therefore not cause interference. Harris Corporation demonstrates in its letter, however, that even such "low power" TETRA operations could interfere with adjacent channel public safety communications. APCO International agrees with that analysis…. Therefore, we urge the FCC to prevent the introduction of TETRA or other technologies where there is evidence that such equipment could lead to interference to public safety radio communications or harm critical interoperability within public safety spectrum.[9]

III. The Core Issue is The Proper Application of Emission Masks to Protect Public Safety.

The situation now facing the Commission is not simply a matter of deciding whether the Mask-B or Mask-H is appropriate for application by TETRA and/or "low power" TETRA equipment for the NPSPAC spectrum. The issue is a more general one: should digitally modulated equipment, regardless of technology take advantage of the "audio low-pass filter" proviso in §90.210 when selecting the appropriate mask to be applied in public safety frequencies.

We hope that this information places arguments against Harris' position on this matter, asserted in the recent PowerTrunk filing, in context. Accordingly, Harris reiterates its request that the Commission immediately:

> 1) Affirm that pre-existing type certifications are not grand-fathered and that "low power TETRA" equipment is not exempt from the Clarification Order's clear statement that all TETRA equipment and operations are prohibited in public safety frequencies or otherwise in the vicinity of public safety systems.
>
> 2) Require that digitally modulated signals be certified under the more stringent H-Mask for use in NPSPAC spectrum. This policy should apply to all digital technologies, not only to those based on TETRA standards.
>
> 3) Withdraw the NPSPAC portion of any existing certification for digital equipment that only applied the Mask B when determining compliance in NPSPAC spectrum.

[9] APCO Ex Parte at 1, 2.

4) Affirm that equipment type certified for use in public safety spectrum must also include support for mutual aid channels and equipment type certifications must include these modes of operation.

We thank the Commission for its consideration, and look forward to its prompt action.

Respectfully submitted,

_____/s/_____

Patrick Sullivan
Government Relations
Harris Corporation